

From the Author.

IMPROVED METHOD

OF

EDUCATION

IN

THE SCIENCES AND ARTS,

AND MORE ESPECIALLY IN

THE SCIENCES CONNECTED WITH MEDICINE.



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Οὕτω γὰρ ἂν μάλιστα καὶ δυνήσκει
εἶπαι, καὶ ὑμεῖς μαθήσεσθε·

ESCHINES.

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IMPROVED METHOD OF EDUCATION IN THE SCIENCES.

IN this attempt to reform and give respectability to EDUCATION, I must first notice the rudest method of teaching, that of APPRENTICESHIP—a barbarous relick of darker ages, when various branches of knowledge were linked with the crafts of the Brewers and Dyers of Guild-hall, and taught by the freemen, as they are called, of their companies, under the appellations of “arts and mysteries”—terms which render it not improbable that their operations and practices were at one time connected with occult science and alchymy. Surely, in the nineteenth century, it is time to shake off all union of higher knowledge with civic companies of common handicraftsmen, or with the jugglings of alchymical delusion.

Of the method of apprenticing, however, it is easy to shew the evils, both educational and moral; here confining our observations to medical apprenticeship.

The Apothecary, it is quite clear, did not originally prescribe, but merely vended, medicines, as his name implies, * and sold them as other tradesmen do their commodities, and as the druggist does at this day. In progress of time, he became a dabbler in the more common and subordinate parts of practice; and he at length joined surgery with these, as did also the barbers. Between the apothecary and the surgeon, the union

* Apothecary from apotheca (Απο and Τιβημι) Anglice, an apothecary, “quod pharmaca sua tanquam in apothecis reponat.”

still exists; but the surgeons have since separated from the barbers, as below their rank and unfit for association*.

I cannot pass over this part of the subject without for an instant calling attention to the number of apothecaries who, under the appellation of general practitioners, now practise medicine and surgery, but who have not passed any surgical examination†, and whose real acquirements are so defective as to make them more dangerous to the community than the veriest impostors, whose avowed object is only to excite credulity and delude the unwary.

That such men are peculiarly obnoxious to the public weal, will be at once evident, when it is recollected that, from the very nature of their calling and their dispersed localities, they are referred to in all sudden emergencies, as well as that, from their being more regular and constant attendants on the sick than the physician or surgeon, they have every opportunity to pour-in their inert or baneful nostrums, without any chance of detection or of receiving a check. In fact, it is well known that such men make, out of some of their hypochondriacal and nervous patients, a constant and regular annuity.

Is not such disgraceful practice as this a fit subject for legislative interference?—It is the duty of eminent and influential members of the legislature to move for a return of all the irregular medical men throughout the kingdom; and to exact, from those who are entrusted with this commission, an accurate account of each practitioner, in order to stop such scandalous practices. I am far from setting any great value on the diploma of the College of Surgeons; but while the present imperfect method of teaching and examining exists, it is unfair to the profession and to the public that any should be suffered to escape with impunity that which the law, though evidently imperfect on this important subject, absolutely requires.

* The period, however, is not very remote; for the late Mr. Abernethy used to say, he had “doffed his cap to Barber-surgeon.”

† It may here be proper to remark, that there are numerous persons practising surgery and making large incomes, who are only apothecaries, who pass off this cheat upon the public, and who laugh at the success, which they owe to there being no legal check, and no public officer to ascertain and report to the College.

Is it to be wondered that the lads bound apprentices to such men, should suffer much and profit little. In fact, the miseries reserved for the youth doomed to be the victim of this disgraceful practice are little known to the public. We may with truth exclaim of him:—"Multa tulit fecitque puer, sudavit et alsit." He lives in a state of slavery in which drudgery and ill treatment are generally united, and that for five years at least. He is from the first, set to do menial offices, going errands and taking out medicines; while he is meanly treated by the mistress of the establishment, most frequently a person of low origin, bad education and vulgar habits, and who consequently (as is likely to be the case with such persons) forms the conclusion, that, as he is her husband's "bound apprentice", he is at her entire command. And good proof of her supposed power does she give, by exercising every species of petty tyranny and insolent overbearing, and making the life of a youth to whom it is her duty to extend the kindnesses due to the son of another, one scene of wretchedness even from the first day of his bondage.

But another and a serious evil of apprenticeship is the loss of so long and valuable a portion of time: for what, I would ask, is the kind and amount of knowledge to be gained from the proprietor of such an establishment? This will be easily understood, when it is considered, that, for the most part, even the Surgeon-apothecary is a person who has originated from behind the counter, is of low descent, without education, and of the most limited professional knowledge,—a person who, if asked to translate a passage in Virgil or Ovid, would be as much perplexed as with a problem in the higher mathematics. At the very utmost, he possesses a jumbled and confused smattering of a little of anatomy, materia medica and pharmacy, culled from the London Dissector, Thompson's Dispensatory, and Steggall's Manuals, which are generally his whole library. To him, the well-arranged study of the branches of science connected with medicine and surgery, is quite a matter of supererogation. The value of more, indeed, is experienced only by more cultivated minds: his calculations are directed solely to the amount of figures in his

"day book"; and his object is gain, not science, or the benefit of any one but himself. That some men of this class are worthy and excellent exceptions to such a character, I freely admit; but, that there is a vast number of these, no one will pretend. Let any one, then, reflect on the utter unfitness of such persons to have the care and education, moral and professional, of youth during five years; and he will perceive and admit the justice of these observations, as well as the urgent necessity for a change.

The fate of young men made apprentices to Surgeons who are not apothecaries, is very different from that of those I have just described; and as the surgeon is commonly a gentleman of education both classical and professional, as well as holding a higher station in society, his establishment corresponds. Yet this does not remove the evil arising from the sad loss of time, which ought to be devoted to a more minute and profound knowledge of anatomy, physiology and surgery, at Institutions where these are really taught. Hence the pupil's time is comparatively mis-spent.

The young man destined to be a Physician does not pass through any farce of apprenticeship: he receives a regular education at College, and he completes his professional studies at public hospitals, or other institutions. Examinations finally prove his qualification and title to practise.

I have adverted to the preceding subject, not merely to shew that it is part of a grievously imperfect method of medical education, and a most unfit ground for licence to practise in a profession unequalled in importance and value, but likewise to satisfy every well-informed mind that these evils, so disgraceful to our scientific institutions and to the country we boast to live in, must be for ever removed.

In teaching the sciences, TWO OBJECTS are in the highest degree IMPORTANT—the best method of impressing on the minds of pupils the facts and the doctrines arising from them, and the employment of a check, by which the professor may be enabled daily to ascertain the attention, conduct and progress of the pupil. These two important obligations may indeed be said to be due by each of these parties to

the other, and by both to the public, in relation to whom it is their duty to fulfil them.

That these objects however cannot be, and indeed never are, thoroughly accomplished by THE PRACTICE OF LECTURES, has long been my established conviction; and this has been confirmed by the experience of years, during which I have had ample opportunities of witnessing the melancholy effects resulting from adherence to so worthless a system.

In these remarks, it is accordingly my duty to point out and to prove that the greatest evils arise from this method of teaching, as well as that this, arising from the vanity, favouritism and cupidity of teachers, is the principal, if not the sole cause, of the ignorance and misconduct of students. That these evils abound in our institutions for education is, to their disgrace, admitted on all sides, as well as the urgent necessity for the substitution of some method which may contribute more to the credit of professions, and to the benefit of the public.

Although, in pointing out the errors of the present system, I shall confine my observations to the medical sciences, as being of the most vital and universal importance, they will, nevertheless, apply with equal propriety and force to every branch of knowledge taught by lectures.

Of THE PROFESSORS, I may remark that very few, at the present time, are above a very ordinary and humble rank, as to talent or acquirements. There seems to be in some persons a natural propensity to assume the office of lecturers, preachers, or spouters of science, as affording them the best opportunity for display and notoriety; while, in almost all cases, they present an exhibition only of ignorance, folly and presumption. Every one, indeed, must have observed the ridiculous ambition exhibited even by some pupils, after they have attended only a course or two of lectures, and before they have acquired any thing like respectable knowledge, to become lecturers; and this has, in many instances, been carried so far as to induce them, in consideration of a small fee for each attendance, to congregate a class, including even women and children, at their mountebank exhibitions; and thus to bring science and its abler professors into ridicule

and contempt. I remember one of these assemblies in a place near Shoe Lane, where anatomy and chemistry were the subjects, and the audience (which was far from select) paid some few pence for admission.

Such being the case, it will not be wondered that the ABSENCE OF METHOD in the various departments connected with the study of medicine, should afford sad proof of the defective state of medical education. Can, indeed, anything be better evidence of the worthlessness of such a system, or more plainly demonstrate the necessity of reformation, than the mass of heterogeneous confusion which is delivered to pupils, even by some of those who are accounted the best lecturers, but whose chief object appears to be, to attract attention, by affected oratory, or by the relation of facetious anecdotes? Does not this directly prove, that the teacher feels the facts he delivers to be so destitute of connecting circumstances—so insulated, as to require such aid, in order to give them the remotest chance of impression on the memory? Instead of making their chief object the discovery of a simple, facile and impressive mode of conveying knowledge, these men, in order to facilitate the remembrance of certain facts, which by their own erroneous system are so placed as to defy recollection, adopt the lazy expedient of introducing stories, cases and anecdotes, often of the coarsest and most vulgar cast, reflecting only disgrace upon a school of science and the profession with which it is connected. Every one of any standing in the profession, can recollect the anecdotes of the Abernethies, the Coopers, the Blizards and the Homes, “cum multis aliis;” and at the present time some humble followers of their example, garnish their harangues with trash too despicable to be worth quotation; forming a ludicrous contrast with the period when the teachers of the art of medicine boasted in their ranks such illustrious men as Monro, Gregory, Black, John and William Hunter, Barclay, Davy, &c.

This want of method is the cause of much DISTRACTION AND LOSS OF TIME even to such students as are ardently devoted to, and diligently pursuing, their studies. The irregularity and confusion in the

lectures, demonstrations, dissections &c., are so annoying to the pupil, that he is often driven to the point of altogether quitting the study of them, or, as I have often seen, is subjected in a serious degree to mental distress and excitement. What memory, indeed, even of the most attentive student, however powerful by nature or improved by practice, can retain the facts comprised in a demonstrative lecture of an hour's duration, or even any considerable portion of these facts, supposing them to be far better arranged than they usually are? Would not any one be deemed insane who should attempt to teach by lectures the words of a language? Would he succeed in teaching them, if he made the attempt? NO. Neither can any one, by such means, teach with accuracy, though he may deliver, and that faithfully, the whole doctrines of the sciences. This he would do with little or no benefit to the pupil; for it is one thing to deliver, and quite another to receive and retain doctrines. Were it not so, why so many auxiliaries to assist the pupil? The reason is plain: the defect is severely felt, though not acknowledged.

Another, and not less serious evil, in this method of teaching by lectures, is its engendering IDLENESS AND INATTENTION, inasmuch as it does not admit of the pupil being, from the time of his entrance on study, made to commence and throughout continue to work for himself; there being no daily method, by which the professor or can detect his inattention, or ascertain his progress, except those trifling and flimsy catechetical trials which are sometimes made, and to which few of those who really know the answers will publicly reply.

From devotion to this long-established custom, it may be argued, that by the discontinuance of lectures, we should lose the valuable observations, experience and remarks of many able and enlightened men, who are not otherwise in the habit of giving to the world the results of their labors. This, I reply, is the very reverse of an objection to the system proposed—it proves its higher value; for the opinions and observations of such men will be far more beneficial and instructive to persons who, by a proper system, have acquired a full and accurate knowledge of the subject treated of, than to such as have, under a

bad system, acquired imperfect and limited knowledge. That the observations of persons of great experience and extensive knowledge are very valuable, I by no means deny; but I affirm, that they are so, only when delivered to those who are versed in the bases of the subject upon which they treat, and that in exact proportion to the degree of knowledge possessed by the audience.

So forcibly indeed is this defect felt, though never distinctly noticed, and still less attempted to be removed by a more rational course, that, to make up for omissions, and to furnish a better knowledge of the particular science occupying the attention of the pupil, a certain class of persons reside in, or are attached to the different universities and other institutions of learning (especially where medical science is taught), who are employed and recognized as the regular and indispensable helpers of the students doomed to submit to this unsystematic, imperfect and tedious method, in order to obtain even the very limited knowledge which is but too commonly possessed by them.

The consequent IMMORALITY AND DISSIPATION in which many students indulge, are well known. Young men sent up from remote parts of the country to a city like London, are so dazzled by the show and gaiety of the place, and are so often misled by the more unsteady of the medical students, that, if not very firm in principles and conduct, they are soon drawn into scenes of folly and vice which often lead to ruin. It must, therefore, be evident to every one, that parents and friends are strikingly deficient in caution when they entrust their sons, under the plan of instruction at present in use, to the dangers of allurements and bad associates. In what, I would here enquire, consist the chief pursuits and occupation of by far the greater number of young men sent to gain a knowledge of their profession at the various schools in this country, especially in London? Are they devoted to the study of its different branches, and excited by an enthusiastic ardour and ambition to excel?—That some undoubtedly are, I will not deny; but by far the greater number are the associates of idlers and drunkards, frequenters of theatres, smoking divans, and even gambling houses and brothels. Such is the oppor-

tunity and scope for idleness and dissipation, which the present negligent and inefficient course of education affords.

That the CHIEF OBJECT OF MOST OF THE STUDENTS, is to endeavour to pass through their examinations with the least possible trouble, and to obtain that very scanty amount of scientific knowledge which will enable them just to gain their diplomas, at either of those libels upon scientific boards—the Apothecaries' Hall or the College of Surgeons—is but too evident. It is consequently a fact, equally notorious and lamentable, that under the present system, their studies are postponed and neglected until the very last moment; when, the period of examination approaching, they, in a state of the most pitiable excitation, distraction and fear, seek eagerly for foreign assistance, in order to fit them for the ordeal which they must undergo,—to be, as is often the case, totally rejected, or to go through it with such hair-breadth chance as is not only painful in endurance, but even in contemplation; to which probably, under a proper system, they would have looked forward without pain, and which they would have passed through with honor to themselves and credit to their teachers.

That the method of oral declamation, then, is not only not the best, but the very worst by which a science of facts can be taught, is a truth which no one of the least reflection or experience will deny. For these reasons, it is the duty of all well-wishers of science to use their utmost influence to secure the attainment of that method, by which it may be taught, not preached. To the developement of such a system as will attain this, my efforts shall be directed.

Having spoken of the lecturers and lectures, I must now speak of the EXAMINERS. The highly dishonorable and disgraceful system of excluding others from their rank, perpetuated by these chirurgical aristocrats, makes the whole of their procedure a most contemptible burlesque. This system of electing examiners, the class from which they are chosen, and the situation in which they are placed—being themselves in practice, are highly prejudicial to the independence and honor of the profession and to the interests of society. From the circumstance of practice being their chief object, their time will not allow them to go into that detail of examination which ought to be

instituted; and their having to sit in judgment upon the sons or relatives of their co-practitioners, with whom they are on terms of friendship, gives opportunity for bias and partiality, and places them in a very invidious situation. Some examiners, indeed, having retired both from practice and from lecturing, have arrived at a state of incapable senility.

As to THE EXAMINATIONS, the method pursued at the College of Surgeons is even less appropriate than that at Apothecaries' Hall; and most of the members of that board being not only in practice, but teachers, there are by far too many causes of partial, hasty and inefficient scrutiny into the pupil's acquirements. Of the nature and character of these examinations, it is impossible to speak without the most unqualified disgust, and without feeling it to be a duty to hold up to contempt the whole system, and the illiterate agents who under it officiate as examiners.

It is well known that some examiners have a routine vocabulary of questions which they bring forth on all occasions. Before a pupil goes up for examination, he is often furnished with information of this by fellow students who have preceded him in the same mummary. If it should happen that the examiner has written on any particular subject, that will probably form the topic, as if a childish "*cacoethes scribendi*" on the only subject he is well acquainted with, were still operating in his mind.

By other individuals of this Junta, the questions put are so framed as either actually to tell the pupil the answer, or on the contrary, to mislead him, at a time when, under a state of high nervous excitement, which always exists on such occasions, he is so confused as to feel uncertain of his knowledge of the question, though, if properly interrogated, he is in fact prepared correctly to reply to it. Thus, if one examiner happen to be present, the interrogation may run thus: "If you open such and such parts, won't you see so and so"? Another may tell him what is partly true, and partly false, in order to elicit his knowledge by a sort of puzzle! If he meet a third party, another train of interrogations may be put, suitable to the fancy of the examiner.

Often the questions to be answered are so totally unconnected with the real objects to which they ought to refer that, to every reflecting mind, it must be evident, that the teachers want as much, and the system more, reformation than the pupils.—When it is stated as a fact, that the following question, among numerous others equally absurd, was very recently put to a young man from the country, no more surely can be wanting to convince the public into what worthless hands are entrusted the guardianship of the education of medical men, and that most important of all charges, the health of the community. The question was “What are the railings round St. Paul’s made of?”—“Iron.”—“What kind of Iron?”—“Wrought iron.”—“What is the difference between that and cast iron?”—“One is iron, the other a carburet of iron.”—After this specimen of mummery, what is the value to the student of a diploma from such hands? or the degree of protection to society against ignorance on the part of the practitioner?

Though, under such a system, the pupil may congratulate himself upon his escape from rejection and from being made a victim to an erroneous method, he cannot feel any real and permanent satisfaction. That can arise only from a confident knowledge of the subject, and his power to pass through the several examinations—a qualification possessed by few who present themselves at these Boards. There, the “*laudari a laudato viro*” is indeed little known.

Thus a few desultory and irrelevant questions, put during some twenty minutes or half an hour, to the pupil, entitle him to practise!—It may be argued, that if the person examined replies promptly and correctly to any question which *happens* to be put to him, it affords an inference that he is acquainted with the subject generally, and must have applied himself diligently to his profession.—That it is *presumptive evidence* of such application and acquirement, must be admitted; but this is not sufficient to entitle him to a licence to practise: it is *proof alone* that can be the foundation of perfect qualification.

Surely, then, such facts (and who dare deny them?) are enough to convince the public of the urgent necessity of reformation in every

stage and step of medical education, from the entrance of the pupil on his studies, to his final test of qualification; and this not merely in what relates to the pupil, but to his instructors, and to the whole chain of proceedings, from the idle and noxious method of lectures, to the last farcical climax of examinations. Indeed, no change is worth the slightest trouble nor will produce the remotest success, except it include a total reformation of the mode of teaching, from the commencement of study to the entrance upon practice.

But the method of determining the knowledge of pupils, is not more disgraceful than the scene which takes place both before the commencement and during the continuance of that farce. With what disgust must every one have witnessed the self-satisfied, easy, careless effrontery, and the cold-blooded, heartless contempt of the feelings of the candidates, displayed by the members of that learned court the "*Collegium Regale Chirurgorum*," as their elegant Latin title styles their sanctuary; while the feelings of the youthful probationer are either wrought to a state of frenzy, or he is on the point of fainting, as his blanched face and quivering lips too plainly tell—unless indeed he has been dosed with opium or hyoseyamus, as is the common practice. During this agonizing period, the examiners are generally occupied in frivolous conversation with each other and with certain titled members, to whom the lower part of the assembly are very courteous, in order to display the familiar terms existing between them. Viewed indeed, as a body, they are a kind of Star-chamber Inquisition, to attempt to revoke whose decrees, would be vain. Their acts admit of no repeal; their secret machinations suffer no remedy; and it is to a change of system, and not of men, that we must apply for the substitution of a better method of education, and for a more rapid advancement of medical science.

Having, in the preceding observations, given details sufficiently minute to satisfy every reflecting mind of the bad effects resulting both to the pupil and to the public, from the present defective and degraded state of scientific education, especially of that portion which

relates to medical science, I may observe that, of the attempt to reform medical practice by legislative enactment, I form no sanguine hopes, until all licence to practise is founded on an improved mode of study. That such enactments will be found necessary to regulate the precise duty of each branch of the profession, if it is not consolidated, and to affix the modes of remuneration, is quite evident; but a more perfect and efficient method of teaching must form the basis of all.

I proceed therefore to lay before the reader, a **NEW AND IMPROVED METHOD**, which must destroy the deference paid to a bad, though established, custom,—which must, at one swoop, remove the numerous and lamentable sources of ignorance and immorality, with which abounds the one now in use,—and which must establish in its stead, one placing in the hands of the student, the easiest and most certain method of gaining a knowledge of his profession, while it gives to the public perfect protection against the dangers of ignorance and the presumption of pretenders;—a method which, from the necessity of making due and daily progress it enforces on the pupils, and the evidence it affords of their advancement or of their neglect to the professors, must, at length, prevail, despite of every obstacle that conflicting interest and grasping cupidity can oppose,—one which, by the well-arranged distribution ~~of~~ ^d ~~instruction~~ and employment of the time of the student, secures him against the allurements of bad company and the dangers of idleness, enables him to gain his diploma with ease and honor, and hands him over to society without disgrace to the one, or peril to the other.

Sure am I, that there is no one who has passed the ordeal of examinations at either Board, viz. Apothecaries' Hall or College of Surgeons, and no one who is about to do so, who would not hail as a boon, a system of instruction which would secure his admission without that dread of rejection and consequent degradation, which, as I have frequently observed, never, in after life, totally loses its stigma, and of which the memory is often revived by rivals who are always ready to do the work of disparagement to one of their own profession.

In the course of this general view of the new method, it is my wish

first to point out this vast contrast between the two methods, that, —while none will deny that under the existing one, very limited and deficient knowledge is quite enough to gain a certificate,—under the one which I propose, it is utterly impossible that any deficiency of knowledge should not be made evident ; nay more (and this is its most valuable feature), the latter entirely prevents the possibility of rejection at public examinations ; for, as the professors would thus be made acquainted from week to week, and from day to day, with the exact knowledge and advancement of every pupil, no one could present himself to the Board, before he had completed the course of study prescribed at the school I seek to establish, or without having arrived at a perfect knowledge of each subject, because he could not be admitted from one class to another, until he had been examined, and his fitness fully proved—in short, until he had learned the whole business of that class. It will therefore, be at once seen, that though he may learn even by the present, imperfect system,—by that now proposed, he *must* learn, or his neglect and ignorance be at once detected, and suitable admonition or other measures be resorted to, even though they should include his dismissal from the Institution ; for it is utterly useless to institute any system, unless all parties are to abide by the rules necessary to carry out its objects, and to perform the duties it requires.

The great end I have in view, is public good. How my humble endeavours may attain it, by this attempt to establish a rational system of education, will be made manifest in the following pages.

The first portion of the method is, to divide each subject into CLASSES (taking, for example, Anatomy, as it is given in the sequel), and again to subdivide these classes as minutely as possible.

The next step is, to have a set of printed CHARTS or CARDS containing just as much matter as can well and easily be acquired each day ; allowing, at the same time, for the other studies which belong to professional education ; the amount of matter on each day's chart being regulated by the whole number required for the course of anatomy. This chart being learnt by the time at which the class meets again, the pupils will be required individually to repeat to the

examiner appointed, and to demonstrate all the parts and circumstances connected with each particular point, on the bone or recent subject, the dry or moist preparation, as the case may be. If the pupil thoroughly know it, he delivers up his chart, and receives another ; if not, he keeps it another day ; and if his deficiencies are but few, he may receive another, but never more than two.

The office of daily examination is to be deputed to the pupils in turn ; so that each is made to demonstrate. Thus, while he is himself learning, he is made to assist others less advanced ; and by this means is maintained a regular system of reciprocal teaching and learning.

At each daily course of instruction, however, the professor is to be present ; and, on his daily inspection, he will have a perfect knowledge of the proficiency, or inattention, of every pupil committed to his care, and will thus be enabled to encourage the one, and correct the other.

The business of the daily examiner is to put the word "Absent", against the name of such pupils as do not attend ; to see that none of the daily charts are undelivered ; and to enter all that are not delivered at the daily attendance. The examiner is also to record in a book the progress of each pupil ; and, if he have made more than two omissions, to state these, in order next day to see if they are then known to the pupil.

At the time of delivering the charts or cards, the person who is entrusted with this office, is, if the subject be anatomical, to demonstrate all that each card contains, on the natural parts. If it be a subject of chemistry, he is to illustrate the facts by experiments, and to explain all relating to them. In the medical and surgical departments, it will be the duty of the teacher, on each succeeding day, to deliver to the pupils of each class, the history and treatment of the accidents which befall those parts, and the diseases which affect those functions, the knowledge of which they have previously acquired. This is all the lecturing admissible into this system of teaching.

When the pupils of any class have acquired the knowledge which

is its object (of the bones for instance), they enter another class (that whose object is the ligaments), and so pass on, until they complete the whole of the classes in the course of instruction ; at which period they receive from the professor, a certificate of attention and proficiency, in order to entitle them to appear before the public examiner, whose duty it is to act between the candidate and the public, as the judge of the one, and the conservator of the interests of the other.

On the Saturday of each week, it will be the duty of the demonstrator of the day, assisted by others (for as already said, one will be appointed for each day), to make recapitulatory examinations of the pupils, as to their knowledge of the week's business, to render up to the professors an account of each pupil's progress, as recorded in the book which is kept for such purpose and which contains an account of the mistakes made by each pupil, in his examinations. If they exceed more than two or three in each day, or by their frequent recurrence evince a want of due attention and perseverance, the pupil must either employ additional time to keep pace with the class, or he must suffer degradation.

To such a method of teaching, no one will hesitate to submit, but those who, under the present one, would avail themselves to the utmost, of the opportunity it affords for inattention and idleness. It is, therefore, for these especially that such a check is requisite. By the assiduous and steady pupil, it will be hailed as a boon ; while the careless one, on the contrary, will be made to feel that he cannot trifle or neglect with impunity, or without detection and remonstrance.

In order to effect rapid and sure progress in the prosecution of all studies, nothing is so essential as simple and natural arrangement. In medical studies, this is especially requisite, in consequence of the great diversity of subjects which they necessarily embrace. In no kind of study, however, has simple and natural arrangement been so little adopted.

Botany, which considers the external form and internal structure of plants, is often preposterously studied after *materia medica*, which

explains their applications; the practice of medicine is often, with equal absurdity, studied before the theory upon which it ought to be founded; and, with not less absurdity, whatever portions of the practice of medicine have in them any thing of mechanical operation, are arbitrarily and most unnaturally patched together under the name of surgery, although they cannot possibly be either separately studied or separately practised.

Even in the general plan of study, there are numerous other mistakes every day committed, not less important than these. To enter into their particular enumeration, would not be an agreeable task, and may be advantageously avoided by delivering a general method, which is at once simple, natural and impressive.

With regard to the GENERAL ARRANGEMENT OF STUDIES:*

I. Mineralogy and chemistry; botany, vegetable anatomy and vegetable physiology; and zoology, anatomy and physiology, which refer entirely to health, if all introduced into a course of medical study, ought to be studied before any of the sciences which refer to disease, and which I shall subsequently mention. They ought also to be studied precisely in the order in which they are here enumerated.

1. Mineralogy, if studied, ought to be studied first, because minerals are more simple in their structure than either vegetables or animals, and also because they afford the materials of which these are composed. It ought even to be studied before chemistry, because it affords the fundamental subjects of chemical operation.

2. Chemistry ought to be studied immediately after mineralogy, because it considers the actions of the substances of which mineralogy merely describes the structure; and, as it is thus so far dependent on mineralogy for its subjects, it necessarily, along with it, precedes botany.

* The Latin and Greek classics, ought, as a portion of elementary education, to precede all medical studies. But to ensure knowledge of this kind to the student of medicine, proper persons should be employed to aid pupils if deficient—especially in medical Latin.

3. Botany, if studied, ought to be studied immediately after mineralogy and chemistry, because it considers the bodies which are next in simplicity, and because the vegetable objects which it describes owe their elements to mineral substances. It ought to be studied before the sciences which refer to animals, because they consider objects which are more complex than its subjects, and also because the subjects of botany afford many of the elements which enter into the formation of the animals which these sciences consider. It ought also to be studied before vegetable anatomy, because the external form of plants should be understood before their internal structure.

4. Vegetable Anatomy ought to be studied immediately after botany, because the internal structure ought to be studied immediately after the external form of plants is understood. It ought to be studied before vegetable physiology, because the actions of the parts of plants cannot be understood before their structure is explained.

5. Vegetable Physiology ought to be studied immediately after vegetable anatomy, because it considers the actions which the previously understood structure performs; and, as it is thus immediately dependent on vegetable anatomy, it necessarily, along with it, precedes animal anatomy.

6. Zoology ought to be studied after botany, vegetable anatomy and vegetable physiology, because it considers the bodies which are next in simplicity, and because the animal objects which it describes owe their elements, directly or indirectly, to vegetable substances. It ought to be studied before anatomy, because the external form of animals, which it considers, should be understood in a general way before their internal structure.

7. Anatomy ought to be studied immediately after zoology, because the internal structure ought to be studied immediately after the external form of animals is understood. It ought to be studied before physiology, because the actions of the parts of animals cannot be understood before their structure is explained.—Comparative Anatomy presents to us nature's innocent experiments, in which no torture is inflicted, no function is deranged, and no blundering conclusion can well be drawn.

In anatomy, the *museles* are sometimes described before the ligaments, although it is impossible to understand the actions which the muscles actually perform without previously knowing the motions which the attachments of the ligaments permit. The arteries are often described before many of the viscera, although it is impossible to understand their course without previously knowing the structure of these viscera. The arteries are always described before the absorbents, although, did the absorbents not preceede them both in existence and in action, the arteries would be destitute of blood. But I need enumerate no more errors of this kind: they are within the reach of every one's daily observation.

In anatomy especially, a better method of teaching is of the highest consequence, as it is indispensable to a knowledge not only of surgery, but of medicine; and this will be successful only by the employment of such a system of teaching, that its facts, if studied, must be acquired, and the teacher daily apprised of the exact progress made, or of any inattention or neglect of the student. That this noblest of all the sciences claims especial attention is evident, as, independently of its value to the physician or surgeon, bringing him into full acquaintance with the means by which "we live, and move, and have our being," and enabling him to relieve with more surety the afflictions of his fellow man, and to obtain for himself well-merited reputation and reward, it is of all knowledge the most essential in every other respect. "The proper study of mankind is man."

No order of studying anatomy and physiology is advantageous either to the teacher or the pupil, except the natural one. That is, the organs and functions termed locomotive ought to be described first; next, those named vital; and, lastly, those denominated mental. Under the locomotive, ought first to be explained the bones or organs of support; secondly, the ligaments or organs of connexion; and, thirdly, the muscles or organs of motion: under the vital, ought first to be explained the absorbing surfaces and absorbents or organs of absorption; secondly the heart, lungs and blood-vessels or organs of circulation; and, thirdly, the glands and secreting surfaces or organs of secretion: under the mental, ought first to be explained the

ear, eye, &c. or organs of sense; secondly, the brain or organ of perception, &c.; and, thirdly, the cerebellum or organ of volition.

Although this general arrangement, first proposed, between thirty and forty years ago, by Alexander Walker, has never been generally adopted, yet every deviation from it is no less a deviation from the natural and the most advantageous method of study.

8. Physiology ought to be studied immediately after anatomy, because it considers the actions which the previously understood structure performs; and, as having a reference only to health, it necessarily immediately precedes the following series of sciences, which refers to disease.

II. Pathology or the theory of diseases, morbid anatomy, materia medica and pharmacy, the practice of medicine, surgery and midwifery, which refer entirely to disease, ought to be studied after the sciences which refer to health. They ought also to be studied precisely in the order in which they are here enumerated.

1. Pathology, of all these, ought to be studied first, because it affords the basis of all subsequent procedure. It ought also to precede morbid anatomy, because it explains those actions which terminate in the states described in morbid anatomy. Pathology may, therefore, be thus considered as regarding causes, and morbid anatomy as regarding effects; though these effects become causes in their turn.

2. Morbid Anatomy ought to be studied immediately after pathology, because it describes the various states which are induced by the actions considered in pathology, and which in their turn induce new actions. It ought also to be studied immediately before materia medica, &c. which refer to the removal of these states, because the states must be understood before their removal can be rationally thought of.

3. Materia Medica and Pharmacy ought to be studied immediately after morbid anatomy, because they afford the means of removing these states. They ought to be studied before the practice of medi-

cine, because no practice can be adopted without previous possession of these means.

4. The Practice of Medicine and the Operations of Surgery ought to be studied immediately after materia medica and pharmacy, because their use ought immediately follow the possession of the means.

5. and 6. Surgery and Midwifery may be regarded as branches of Medical Practice.

With regard to THE TIME WHICH THESE STUDIES OUGHT TO OCCUPY, three, or four years may suffice.

In the winter of the first year, ought to be studied mineralogy and chemistry : in its summer, botany, vegetable anatomy, and vegetable physiology.

In the winter of the second year, these sciences ought to be reviewed ; and zoology, anatomy and physiology, ought to be studied. The review of the preceding year's studies will occupy little time ; zoology, generally considered, will not occupy much ; anatomy and physiology will be entitled to the greatest share of it ; and actual dissection will be so in an especial manner. Nor is this period, if both lecturer and pupil do their duty, by any means too short for considerable advance in these sciences. The summer of the second year ought to be occupied with the continued review of the preceding sciences, especially with the last—anatomy, comparative anatomy and physiology, with dissections ; and pathology and morbid anatomy ought now to be studied.

In the winter of the third year, the preceding sciences ought still to be reviewed, especially anatomy, comparative anatomy and physiology, with dissections, and also pathology and morbid anatomy ; and materia medica and pharmacy, and the practice of medicine, ought now to be studied. The summer of the third year ought to be similarly employed. And, during the summer (if not the winter) of this year, an hospital ought to be attended.

Those, who can employ four, instead of three, years, ought to employ the last in a continued revision of preceding studies,

and especially in attendance at an hospital; so that the period of actual practice may be enlarged.

To attend an hospital, however, before the study of the practice of medicine and surgery has been begun—that is, in the third of a three years course of study, such as I have described, is utterly useless, except to those who may have previously studied at another school or university.

Under the system, then, of daily, gradual and progressive instruction here described, the pupil would with facility gain ample, well-arranged and satisfactory knowledge, would soon become satisfied with the advancement he had from time to time made, and would give assurance, to those entrusted with the direction of his scientific education, of the proper employment of his time in the various departments of his profession.—Under this test of daily examination, the professor may become acquainted with the moral occupation and progressive advancement of his pupils, and thereby be able, not only to check such improprieties of habit as may otherwise become fixed and established, but to cultivate and confirm in them the conduct and habits of gentlemen.

Instead of the barbarous system of apprenticeship, the youth, who selects medicine as his profession, should at once commence his studies according to the method here stated, which, instead of wasting five years, may, in four years, complete for him a regular and profound course of education in every branch of science relating to medicine and surgery; following in succession the plan given for each subject, in strict observance of the previous “*lucidus ordo*.”

With regard to HOSPITAL ATTENDANCE, I may here observe, that the surgeon requires surveillance, as well as the pupil. It is much to be desired that a strict eye were kept upon the way in which patients are treated, particularly on days of admission at hospitals and dispensaries, and that all cases were reported wherein patients are made to wait some three or four hours until the medical officer arrives, though their diseases are often such as to be increased by exposure to cold, &c.

As to EXAMINERS, they ought to be chosen from among medical men

retired from practice, and unfettered by its urgent duties and inevitable anxieties ; they ought to be perfectly independent of all occupation disqualifying them for this office ; and their time ought to be devoted solely to testing the knowledge and qualifications—the fitness or incapacity of the candidate to undertake the duties of his profession. They would thus be placed above the suspicion of partiality. When indeed the importance of these sciences, and their practical application to the vast and sad catalogue of human afflictions, are duly estimated, it will be evident, that the best system of teaching them, and that of giving ample and perfect satisfaction to a duly qualified Board of Examiners, is at once a protection to the honor and character of the healing art, and a duty to mankind.

To remedy the errors of THE EXAMINATIONS, I have formed a plan founded on the system which I am here inculcating, a plan which at once rids the examiner of much of his irksome task, and secures him from all suspicion either of partiality or of indulgence of ill temper. As I have said, that not mere *presumption* of qualification is sufficient, but that absolute *proof* is demanded, the examinations must be such, in point of substance and duration, as will allow the examiner to be satisfied of the perfect knowledge of the candidate. Instead, therefore, of a few extemporaneous questions being required, a Table of Examination on each subject is to be kept, and one also of the Answers to be given. From this, the probation is to be made; and it is evident, that by such method, even if the pupil were rejected, he could feel no personal ill will to the examiner who put them ; for his inappropriate replies being shewn to him, all impression of partiality would at once be removed, and the conviction, that with himself alone lie all the blame and degradation, would take possession of his mind.

It is true, these tables of questions and answers may get into the hands of students, who may thus prepare themselves on the precise points of enquiry.—Well, so much the better : they will be profoundly versed in Medicine and Surgery !

I am impressed with the deepest conviction that, for the interests of the profession and of society, *these examinations, instead of enduring less than an hour, ought to continue a week, or rather, until the knowledge*

or ignorance of the candidate is fully ascertained; that, instead of only one examiner at each board, there should be as many as the subjects embraced; and that the pupil should be most minutely examined in every subject connected with medicine and surgery.

That this attempt to put down a worthless system, and erect in its stead one founded on reason, will draw down upon me the odium and obloquy of the adherents to that which is recommended only by its suitableness to their purposes and advantages, is to me a matter of the most ineffable unconcern. Having great scorn for the quackeries with which medicine at present abounds, and for the cupidity which lecturing so ably assists, and being placed totally out of the reach of selfish and malignant interests, I cannot be injured by them in the remotest degree. I remain in perfect confidence and security as to the success of the method I propose, and in full certainty of its benefits to science and mankind, to whom alone I look for approbation.

IMPROVED METHOD OF EDUCATION IN THE ARTS.

That the method employed for teaching the various arts, manufactures and trades, to those about to engage in such occupations, is as bad, and as productive of educational and moral mischief, to the youth, who, under the bondage of apprenticeship, is being initiated into their secrets and practices, as that which I have endeavoured, though but imperfectly, to describe, with regard to scientific instruction, will be made apparent by the following observations.

There is, *prima facie*, one serious and universal evil in all such cases—the taking from the guardianship of parental care, or of well-known friends, an inexperienced youth, and placing him among strangers, with whose tempers and habits he is as entirely unacquainted as they are with his. This, I contend, is of itself a practice preventive of much good, and productive of much harm: hence its abolition is indispensable.—What, I would here inquire, is to be expected of connections thus made, and of obligations thus obtained? How, in most cases, are these matters effected?

For the sake of some small premium and temporary aid, the master, as he indecently terms himself, seeks by advertisement to prop up his embarrassed circumstances, by “taking an apprentice,” as it is called; and the friends of the youth, induced by the low rate of fee, are tempted to enter into negotiation. They agree, perhaps; and “the indenture” is signed, which dooms the unfortunate young

man to seven years servitude, too often to ruin. In a short time perhaps, owing to the failure of his first master, he is turned over to some other person of the same business; and frequently to a third, and a fourth, until eventually he loses his premium, and with it all chance of gaining a knowledge of his avocation; but even if this be not the case, and he drag through the period of his slavery, he does so, mostly, under one uniform course of tyranny and oppression, and what is more, with every license and opportunity of forming bad connections and associates, which, under parental superintendence, he would have escaped.

I trust, then, that I have, even in this statement, adduced reasons enough to satisfy any reflecting mind, interested in the well-being of the young artizan, of the urgent necessity which exists for an immediate reformation of a practice so injurious to the common good, and so foul a disgrace to this age of intellectual advancement.

Besides the bad effects of apprenticeship, its expense and its unfitness and incapability to give a perfect and masterly knowledge of the particular business (unless it happen to be one of the lower and more facile ones—and then surely so sad a waste of time is alone mischievous enough), are no less injurious and fit for correction. For it may be shown, that, by a proper method of demonstrating and teaching the various matters belonging to each particular art, a thorough and more accurate knowledge can be acquired in a few weeks than from such persons can be obtained in seven years.

What, I would, moreover, ask, is the fate of apprentices in general? Often does it cost friends or guardians several hundred pounds to initiate the youth into the supposed secrets of certain businesses. Instead, however, of the due performance of the engagement, he is thrown into a vortex of vice of every kind and degree, as may soon be ascertained by visiting any of the large establishments, particularly in London and other principal towns, in which warehouses and counting-houses exhibit the worst examples of the most degrading ignorance, profligacy and vice blended with the most vulgar foppery. In every street in the metropolis, are our eyes tortured by the sight of crowds of ignorant youths occupying

the situations of young women, in haberdashers' and milliners' shops, while the females are driven to poverty or to the streets. It is truly frightful that any innocent young man should thus be placed in contact with such a herd, copying only the idiot follies and degrading vices of their customers. It is perhaps impossible to select for a youth places more calculated to corrupt the morals and to establish bad principles. In fact, ignorance, folly and vice there struggle for ascendancy, and the whole presents a melancholy picture of human nature in one of its lowest depths of degradation. No less dangerous and degrading is the practice of sending a youth into immediate contact and intercourse with low and dissipated mechanics, among whom is found vice no less degrading than in the former case, and still more coarse and disgusting.

Having shewn the evils of apprenticeship, I may now point out its absurdity and uselessness. Every art, manufacture, or commercial business is founded on certain fundamental principles, or rules of practice and tact, which can be explained and taught by comparatively few lessons and directions. These ought to form the bases of the first part of a youth's education in his particular subject; and, after he has obtained these, his knowledge ought to be enlarged by such other instruction and practice as the nature of the individual department indicates.

In some arts, as those connected with mechanical science, there is some necessity for gradual practice under the eye of a proper instructor. The arts of the carpenter, builder and sculptor are among these, and in short all such occupations as require the repeated performance of a certain operation in order to give adroitness or facility. Still, even in many of these, I doubt whether, except in extreme cases, a removal from parental care is either necessary or beneficial; and certain it is that, wherever it is avoidable, it ought by no means to take place, unless certain other circumstances of urgent nature require its adoption.

Having now advanced all that appears necessary to be said upon evils arising from apprenticeship in the arts, I may briefly state the method I seek to establish:

First, I propose to form an establishment in which the arts and manufactures are distinctly taught; as dyeing, calico-printing, soap-making, glass-making, brewing, &c., and in these, to give full instructions, demonstrations and explanations, by means of apparatus suited to the various operations required. For this purpose, a separate compartment must be fitted up, so as to furnish the student, in each art, with the means of the regular manipulation on which it is founded; and with this, to communicate clearly the rationale of each particular process and operation.

Secondly, The next step must be to make him learn each distinct process, repeat the operation by means of the apparatus, and explain the theory of its action; giving a complete scientific explanation of each step, and relating the causes of the different results, as he proceeds—in fact, proving his thorough acquaintance with the particular art in all its branches, both as to causes and effects.

In the mere sketch which this is intended to be, further details are unnecessary.

CHARLES WATT.